

The Chinese University of Hong Kong  
Department of Geography and Resource Management

will present a seminar

by

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**Urbanization and Climate Change Implications in Flood Risk Management:  
Multi-criteria Approach in Developing Flood Susceptibility Maps**

**Abstract:**

Lately, flooding has been occurring more frequently with greater severity in many parts of the world, including countries with arid climate such as Egypt with limited annual rainfall. Could the worldwide rising occurrences of hydrologic extremes be attributed to the effects of climatic warming and El Niño, and/or the impact of urbanization, or both? A warmer climate means the atmosphere will be loaded with more water vapor which is fuel for developing intensive storms and hurricanes. The effects of urbanization and climate change in the flood risk management of two arid regions of Egypt are first presented. The Pettitt Test for abrupt change points, and non-parametric trend detection algorithms were applied to the rainfall and temperature data of two governorates of Egypt to estimate the possible impact of climate change to their flood risk. The time series of surface runoff between 1948 and 2014 developed for the Beheira and Alexandria Governorates of Egypt were also analyzed for possible abrupt change points and trend to assess the influence of urbanization in surface runoff. Next, a methodology is developed to derive flood susceptibility maps of the selected flood prone regions of Egypt. We delineated flood susceptibility zones in the two governorates using a geographic information system-based decision support system (DSS), a susceptibility model and remotely sensed data. Using an Analytical Hierarchy Procedure (AHP)-DSS approach, we developed the susceptibility rankings in terms of weights for these factors that could contribute to flooding: (1) flow accumulation, (2) distance from the drainage network, (3) elevation, (4) land use/cover, (5) rainfall intensity, (6) geology, (7) slope, (8) runoff, (9) soil type, (10) drainage density, and (11) curvature. Based on these thematic maps, the susceptibility model delineated flood susceptibility zones in both governorates to very high, high moderate, low and very low susceptibility to flooding, respectively. These flood susceptibility maps, validated against historical flood records, can be used for flood mitigation/ planning purposes.

**About the Speaker:**

Thian Yew Gan is a professor of civil & environmental engineering of the University of Alberta specializing in water resources, hydrology, cryosphere, remote sensing, and environmental impact of climate change. He is a research ambassador of DAAD (German Academic Exchange Service), a fellow of the American Society of Civil Engineers (ASCE), and a Lead author of AR6-WGI of Intergovernmental Panel of Climate Change (IPCC). He is the recipient of the ASET Technical Excellence Award of 2017, and 9 international fellowships from USA, Japan, Sweden, Singapore, New Zealand, Hong Kong and Australia. He has published about 130 refereed journal papers in various reputable international journals, e.g., Nature Publishing Group, and a book, "Global Cryosphere, Past, Present and Future" by the Cambridge University Press. He has been a visiting professor to Hong Kong University (2017), University fellow of Hong Kong Baptist University (2019) & Ludwig Maximilian University, Germany (2017); Chinese University of Hong Kong (2016-17, 2019); Isaac Manasseh Meyer Fellow of National U. of Singapore (2014), Tan Chin Duan fellow of Nanyang Technological U. of Singapore (2013); visiting professor of Aalto University, Finland (2013, 2017); visiting scholar of United Nation University (UNU-FLORES), Germany (2013); Rosby Fellow of Stockholm University, Sweden (2012); Erskine Fellow of University of Canterbury, New Zealand (2011); Visiting professor of Swiss Institute of Technology (EPFL), Lausanne, Switzerland (2010); Research Scientist of Cemagref, France (2009); CIRES Visiting Fellow of University of Colorado-Boulder (2007); DAAD and University professor of the highest academic rank (W3) of Technical University of Munich, Germany (2006-07); Adjunct professor of Utah State University, USA (1998-2005); Honorary Professor of Xian University of Technology and Yangtze University of China; JSPS Fellow of Kyoto University (2000) and guest professor of Saga University (1999) of Japan, and assistant professor, Asian Inst. of Technology (1989-1990), Bangkok.

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Venue: Room 221

Chen Kou Bun Building  
Chung Chi College

~All are Welcome~

**Reschedule to: 11 July 2019 (Thu)**  
**2:30-3:45pm**

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